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| UTILITY PATENT APPLICATION TRANSMITTAL <i>Only for new nonprovisional applications under 37 C.F.R. § 1.53(b)</i> | Attorney Docket No. | 97RSS430/71392 |
| | First Inventor or Application Identifier | |
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02/09/99

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

1. *Fee Transmittal Form (e.g. PTO/SB/17)
(Submit an original and a duplicate for fee processing)**ADDRESS TO:**Assistant Commissioner for Patents
Box Patent Application
Washington, DC 202312. Specification
(preferred arrangement set forth below)Total
Pages

15

5. Microfiche Computer Program (Appendix)

- Descriptive title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. Drawing(s) (35 U.S.C. 113)

Total Sheets

3

6. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)

- a. Computer Readable Copy
- b. Paper Copy (identical to computer copy)
- c. Statement verifying identify of above copies

ACCOMPANYING APPLICATION PARTS7. Assignment Papers (cover sheet & document(s))8. 37. C.F.R. § 3.73(b) Statement
(when there is an assignee) Power of
Attorney9. English Translation Document (if applicable)10. Information Disclosure
Statement (IDS) PTO-1449 Copies of IDS
Citations11. Preliminary Amendment12. Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)Statement filed in
Prior application,
Status still proper
and desired13. *Small Entity Statement(s)
(PTO/SB/09-12)0 14. Certified Copy of Priority Document(s)
(if foreign priority is claimed)15. Other: _____

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16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment

 Continuation Divisional Continuation-In-Part (CIP) Of prior application No.: _____ / _____

Prior application information: Examiner _____ Group/Art Unit: _____
FOR CONTINUATION or DIVISIONAL APPS ONLY: The entire disclosure of the prior application, from which an oath or declarations supplied
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| <input type="checkbox"/> Customer Number or Bar Code Label | (Insert Customer No. or attach bar code label here) | | | or | <input checked="" type="checkbox"/> Correspondence address below |
| Name | Jon P. Christensen, Esq. WELSH & KATZ, LTD. | | | | |
| Address | 120 S. Riverside Plaza 22 nd Floor | | | | |
| City | Chicago | State | Illinois | Zip Code | 60606 |
| Country | US | Telephone | (312) 655-1500 | Fax | (312) 655-1501 |
| Name Print/Type) | Jon P. Christensen | | Registration No. (Attorney/Agent) | 34,137 | |
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SELECTIVE MESSAGING IN A MULTIPLE MESSAGING LINK
ENVIRONMENT

5

Field of the Invention

The field of the invention relates to automatic call distributors and more particularly to peripheral devices attached to automatic call distributors.

10

Background of the Invention

Automatic call distributors (ACDs) are known. Such devices are typically used by service organizations where ever a large number of calls must be matched with a limited number of agents. The calls handled by ACDs may be either incoming or outgoing.

Sales organizations may use automatic call distributors (ACDs) to receive and distribute incoming calls to customer service agents. Often the sales organization will disseminate a single telephone number to its customers. As customers call the telephone number, the calls must be distributed to the organization's agents. In order to distribute incoming calls, the ACD must first be able to detect an incoming call, then select an available agent and, finally to route the call to the selected agent.

In order to select an agent and equalize a workload among a group of agents, the ACD must be able to detect when an agent is idle (i.e., not occupied with a prior call). When ever an agent is idle, the switch may assign a call to that agent. Idle time, in

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fact, is often used as a equitable means of determining which agent will receive the next incoming call.

In the case of either incoming or outgoing calls, it is important for an agent working at an agent station to have ready access to customer records. In addition to a telephone, an agent station also typically includes a computer terminal coupled to a system database (host) for purposes of providing and maintaining customer records. While an agent could individually identify customers to the host by the manual entry of a customer identifier, it is generally more efficient that the ACD identify a customer to the host.

Typically, the ACD identifies the customer to the host by use of the customer telephone number. On either incoming or outgoing calls, the ACD transfers the telephone number to the host along with an identifier of a selected agent when the call is assigned to the agent. In the case of incoming calls, the ACD may identify a caller's telephone number through PSTN features such as automatic number identification (ANI).

In large service organizations, many ACDs and agent groups may exist over wide geographic areas, often in different time zones. ACDs may be interconnected to share call processing. ACDs which become overloaded may transfer (overflow) some calls to other ACDs.

Where a call is transferred from a first ACD to a second ACD, it is important to transfer whatever information exists about the call to a destination ACD. However, a transferring ACD may not know which ACD will

ultimately accept the call. Often, the receiving ACD is served by a different host than the transferring ACD. As a consequence, a message transmitted from one ACD or host is typically transmitted (broadcast) to all connected ACDs and hosts. Further, any message received by a first ACD or host is automatically re-broadcast to any other ACD or host connected to the first ACD or host. As ACD systems have increased in size, the number of messages transmitted has also increased. In some cases unnecessary messages degrade system operation. Accordingly, a need exists for a means of reducing message traffic within an ACD system.

Summary

15 A method and apparatus are provided for forwarding messages among peripherals of an automatic call distributor. The method includes the steps of forming a message table in a first peripheral of the automatic call distributor and forwarding a message from the 20 first peripheral to a second peripheral of the automatic call distributor based upon a content of the message table.

25 Brief Description of the Drawings

FIG. 1 depicts a block diagram of an automatic call distributor in accordance with an illustrated embodiment of the invention;

30 FIG. 2 depicts a messaging table that may be used by the system of FIG. 1; and

FIG. 3 depicts a messaging matrix that may be used by the system of FIG. 1.

Detailed Description of a Preferred Embodiment

FIG. 1 is a simplified block diagram of an ACD system 10, generally, in accordance with an illustrated embodiment of the invention. The system 10 is provided 5 with programmable messaging links for control of messages which are not of interest to a data device. The use of the programmable messaging link allows the data to remain backwards compatible with existing data applications.

10 The system 10 may be of a type similar to that provided by any of a number of ACD system makers (e.g., the Spectrum system made by Rockwell International). The Spectrum system typically has a broadcast capability accommodating three data links between 15 peripheral devices. These links broadcast whatever data the Spectrum has among the three links. As such, peripherals may get messages which may not be of interest to the peripheral.

One solution is the development of separate 20 logical links for each of the data paths. However, this requires a large amount of development resources to successfully implement. The programmable messaging link described below provides a much less complex solution.

25 As shown in FIG. 1, one or more ACDs 14, 16, 18 of the system 10 may receive calls from the PSTN 12 and distribute the calls among a local group of agents (not shown) assigned to each particular ACD 14, 16, 18.

Also shown in FIG. 1 is a host 20, 22, 24 30 connected to a respective ACD 14, 16, 18. Each host 20, 22, 24 may receive information about calls from it

respective ACD and exchange information about callers with a terminal of an assigned agent.

While each host 20, 22, 24 of FIG. 1 is shown connected to a single ACD 14, 16, 18, it should be understood that each host (e.g., 20) may serve more than one ACD (e.g., 14). Since each host 20, 22, 24 and each ACD 14, 16, 18 performs a supporting function within the system 10, hosts or ACDs may be individually referred to as system peripherals.

As calls are received by the ACDs 14, 16, 18 from the PSTN 12, the PSTN 12 may also transfer destination and source information about each call to the ACD 14, 16, 18. The receiving ACD 14 may assign a call identifier, unique to that ACD, and begin the process of identifying an agent to service that call. The ACD 14, 16, 18 may also transfer a call arrival message to its respective host 20, 22, 24. Alternatively, once the ACD 14, 16, 18 has identified an agent, the ACD 14, 16, 18 may transfer a call assignment message to the host 20, 22, 24. The respective host 20, 22, 24 may broadcast that message to other connected hosts.

In order to reduce message traffic, each peripheral 14, 16, 18, 20, 22, 24 of the ACD system 10 is provided with a message processing table 30 (FIG. 2), which forms a basis for a programmable messaging link. Included within the message table 30 is a message identifier side 32 (shown on the left) and a destination side 34 (shown on the right).

Messages within the system 10 may be forwarded (or not forwarded) based upon a content of the message table 30. For instance, the table 30 may contain indices of messages that are not to be forwarded.

Alternatively, the table 30 may be used to identify messages which are to be forwarded.

Where the table 30 is used for messages which are not to be forwarded, a CPU (e.g., 29) may use the 5 contents of the table 30 as a means of deleting messages. For example, messages may be received in a receive buffer (not shown) of the CPU 29 and be transferred by the CPU 29 to a transmit buffer for transmission (broadcasting) to other connected 10 peripherals. As each message is detected in a receive buffer of the CPU 29, a comparison is made between that message and the individual entries of the table 30. Where a match is found, the message may be deleted 15 before it can be re-broadcast to the one or more connected peripherals.

Alternatively, the table 30 may be used (in an opposite sense) to forward messages. When used in the opposite sense, messages are compared with the table 30 and when a match is found, the message is only 20 forwarded to the destination specified in the table 30.

The message identifier side 32 of the table 30 may be structured to contain a number of message identifiers. Typically each message identifier correlates with a single message destination, but in 25 some cases a particular message identifier may be correlated with many destinations or a destination may be correlated with many types of message identifiers.

A message identifier may refer to a particular type of messages or a message from a particular source. 30 For example, a particular type of message identifier may be "call arrival" message, an "agent assignment" message, a "call overflow" or a "fault message".

Further, the entries of the message identifier side 32 of the message processing table 30 may be further differentiated through use of a message matrix 36 (FIG. 3). A message matrix 36 may be described as a 5 set of attributes that a message may need before it will be forwarded (not forwarded) to a particular destination. For example, one of the messages of the message identifier side 32 of the message table 30 may correspond to one of the lines 38, 40, 42, 44, 46, 48, 10 50 of the message matrix 36.

As a more specific example, the table 30 of FIG. 2 may reside in a memory 28 the second host 22. Message #1 of the message identifier side 32 of the table 30 may correspond to the second line 40 of the message 15 matrix 36 of FIG. 3. A destination "a" of the destination side 34 may correspond to the first host 20.

As messages are received by the second host 22, they are compared to the message identifiers on the 20 message identifier side 32 of the forwarding table 30. In the example above, where a message is identified as being from third host 24 regarding fault messages about ANI, that message would be sent (not sent) to the requesting host 20 depending upon the use of the 25 message table 30.

As another example, message identifier #5 of the message identifier side 32 of FIG. 2 may correspond to the first line 38 of the message matrix 36. Further, destination "d" may correspond to the third host 24. 30 In this example, overflow messages from the ACD 14 of the first host 20 regarding overflow calls from agent

#1 would be sent (not sent) to the third host 24 depending upon the use of the message table 30.

The message table 30 and message matrix 36 may be created during startup of the system 10 and modified 5 during use. For example, the third host 24 may wish to receive all (or none of the) messages from the first ACD 14. Upon startup, the third host may by reference to a lookup table and determine that the first ACD 14 may be contacted through the second host 22. As such, 10 the third host 24 sends a message to the second host 22 concerning messages from the first ACD 14.

The second host 22 by reference to its own lookup table determines that the first ACD 14 is not directly connected to it and therefore sends a message to the 15 first host 20 concerning the messages from the first ACD 14. The second host 22 also makes an entry in its own table 30. On the right side 34, the second host 22 enters an identifier of the third host 24. On the left side 32 on the same line, the second host 22 enters an 20 identifier of the message or, where necessary, a reference to a particular line 38 of the message matrix 36. Where a reference is made to a particular line 38 of the message matrix 36, the second host 22 enters an identifier of the ACD 14 and other information into an 25 appropriate position of the reference line 38.

Similarly, when the first host 20 receives the request regarding the messages from the first ACD 14, the first host 20 makes an entry into its forwarding table. By reference to a lookup table, the first host 30 20 determines that the first ACD 14 is connected directly to it and enters an identifier of the first ACD 14 (as a type of message identifier) on the left

side 32 of its forwarding table 30. The first host 20 also enters an identifier of the second host 22 on the right side 34 of its table 30 on the same line.

The use of the message table 30 allows a peripheral to selectively exclude messages, or message elements which are not of interest to the peripheral. The table 30 allows peripherals to send programming messages on initialization of the peripheral to specify the messages it does not want to see (or which it does want to see) on the messaging link. The programming messages and table 30 may be used as part of a simple messaging filter which may functions to reduce or exclude messages over a particular link. This effectively provides the same sort of functionality as having separate logical links.

A specific embodiment of a method and apparatus for select messaging in a multiple messaging link environment according to the present invention has been described for the purpose of illustrating the manner in which the invention is made and used. It should be understood that the implementation of other variations and modifications of the invention and its various aspects will be apparent to one skilled in the art, and that the invention is not limited by the specific embodiments described. Therefore, it is contemplated to cover the present invention any and all modifications, variations, or equivalents that fall within the true spirit and scope of the basic underlying principles disclosed and claimed herein.

Claims

1. A method of forwarding messages among peripherals of an automatic call distributor, such method comprising the steps of:
 - 5 forming a message table in a first peripheral of the automatic call distributor; andforwarding a message from the first peripheral to a second peripheral of the automatic call distributor based upon a content of the message table.
- 10 2. The method of reducing message traffic as in claim 1 further comprising entering an identifier of a message to be forwarded into the formed message table in the peripheral.
- 15 3. The method of reducing message traffic as in claim 2 wherein the step of entering the identifier of the message further comprises entering a corresponding destination identifier to the entry.
- 20 4. The method of reducing message traffic as in claim 3 wherein the step of entering the identifier further comprising providing a reference to a line of a message matrix.
- 25 5. The method of reducing message traffic as in claim 4 wherein the step of sending the list of unnecessary messages further comprises storing the list in said table of the automatic call distributor.

30

6. The method of reducing message traffic as in claim
5 further comprising forming a message for transmission
to a set of peripherals, including said peripheral.

5 7. The method of reducing message traffic as in claim
6 wherein the step of forming a message for
transmission to a set of peripherals further comprises
retrieving an identifier of said peripheral of the set
of peripherals.

10 8. The method of reducing message traffic as in claim
7 wherein the step of retrieving an identifier of said
peripheral of the set of peripherals further comprises
retrieving the list of unnecessary messages from said
table based upon said identifier of said peripheral.

15 9. The method of reducing message traffic as in claim
8 wherein the step of retrieving the list further
comprises comparing an identifier of the message with
20 the list of unnecessary messages transmitted from said
peripheral to the automatic call distributor.

25 10. The method of reducing message traffic as in claim
9 wherein the step of comparing the identifier of the
message with the list of unnecessary messages further
comprises discarding the message when a match is found
between the identifier of the message and an entry of
the list of unnecessary messages.

30 11. Apparatus for reducing message traffic in an
automatic call distributor, such apparatus comprising:

means for forming a message table adapted to control messages forwarded to a peripheral of the automatic call distributor; and

means for amending the table upon startup of the
5 peripheral.

12. The apparatus for reducing message traffic as in claim 11 further comprising means for forming a list of identifiers of unnecessary messages in the peripheral
10 upon startup.

13. The apparatus for reducing message traffic as in claim 12 wherein the means for forming the list of unnecessary messages further comprises means for
15 retrieving the list from memory.

14. The apparatus for reducing message traffic as in claim 13 further comprising means for sending the list of unnecessary messages to the automatic call
20 distributor.

15. The apparatus for reducing message traffic as in claim 14 wherein the means for sending the list of unnecessary messages further comprises means for
25 storing the list in said table of the automatic call distributor.

16. The apparatus for reducing message traffic as in claim 15 further comprising means for forming a message
30 for transmission to a set of peripherals, including said peripheral.

17. The apparatus for reducing message traffic as in
claim 16 wherein the means for forming a message for
transmission to a set of peripherals further comprises
means for retrieving an identifier of said peripheral
5 of the set of peripherals.

18. The apparatus for reducing message traffic as in
claim 17 wherein the means for retrieving an
identifier of said peripheral of the set of peripherals
10 further comprises means for retrieving the list of
unnecessary messages from said table based upon said
identifier of said peripheral.

19. The apparatus for reducing message traffic as in
15 claim 18 wherein the means for retrieving the list
further comprises means for comparing an identifier of
the message with the list of unnecessary messages
transmitted from said peripheral to the automatic call
distributor.

20. The apparatus for reducing message traffic as in
claim 19 wherein the means for comparing the identifier
of the message with the list of unnecessary messages
further comprises means for discarding the message when
25 a match is found between the identifier of the message
and an entry of the list of unnecessary messages.

21. Apparatus for reducing message traffic in an
automatic call distributor, such apparatus comprising:
30 a message table within a memory of the automatic
call processor adapted to control messages forwarded to
a peripheral of the automatic call distributor; and

a message processor adapted to amend the table upon startup of the peripheral.

22. The apparatus for reducing message traffic as in
5 claim 21 further comprising a table within a memory of the peripheral adapted to form a list of identifiers of unnecessary messages in the peripheral upon startup.

23. The apparatus for reducing message traffic as in
10 claim 22 wherein the table for forming the list of unnecessary messages further comprises a peripheral processor adapted to retrieve the list from memory.

24. The apparatus for reducing message traffic as in
15 claim 23 further comprising a communication processor adapted to send the list of unnecessary messages to the automatic call distributor.

25. The apparatus for reducing message traffic as in
20 claim 24 wherein the communication processor adapted to send the list of unnecessary messages further comprises a receiving processor adapted to storing the list in said table of the automatic call distributor.

Abstract

A method and apparatus are provided for forwarding messages among peripherals of an automatic call distributor. The method includes the steps of forming 5 a message table in a first peripheral of the automatic call distributor and forwarding a message from the first peripheral to a second peripheral of the automatic call distributor based upon a content of the message table.

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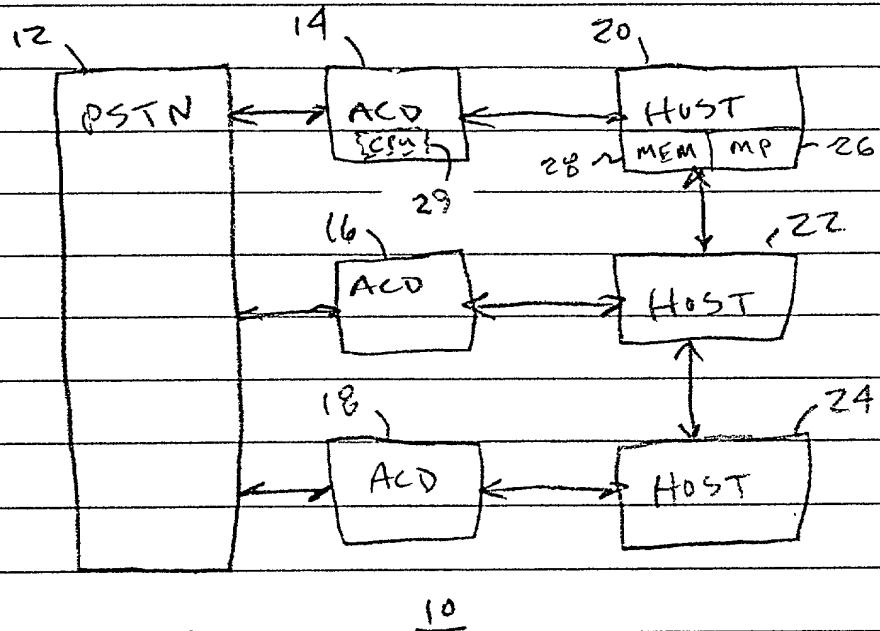


FIG. 1

MESSAGE 17

DEPARTMENT 17

32

4
3
2
1
5

6

2
3
4
5
6

33

10

30

EEG. 2

| | <u>MESSAGE SOURCE</u> | <u>MESSAGE TYPE</u> | <u>OBJECT</u> |
|------|---------------------------|-------------------------|---------------|
| 38 → | ACD 14 | OVERFLOW | AGENT #1 |
| 40 → | HOST 24 | FAULT | ANI |
| 42 → | | | DNIS |
| 44 → | | | TRUNK # |
| 46 → | HOST 1 | | |
| 48 → | HOST 2 | | |
| 50 → | HOST 3 | | |

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FIG. 3

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare:

That my residence, post office address and citizenship are as stated below next to my name.

That I verily believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SELECTIVE MESSAGING IN A MULTIPLE MESSAGING LINK ENVIRONMENT

the specification of which is attached hereto.

That I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

That I acknowledge the duty to disclose information to be material to patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

That I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s) None

I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below.

(Application Number) (Filing Date)

(Application Number) (Filing Date)

That I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

United States Application(s)

(Application Serial No.) (Filing Date) (Status)-(Patented, pending, abandoned)

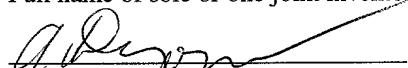
(Application Serial No.) (Filing Date) (Status)-(Patented, pending, abandoned)

That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

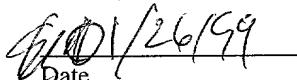
I hereby appoint the following attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith and request that all correspondence and telephone calls in respect to this application be directed to WELSH & KATZ, LTD., 120 South Riverside Plaza, 22nd Floor, Chicago, Illinois 60606, Telephone No. (312) 655-1500.

| <u>Attorney</u> | <u>Registration No.</u> |
|------------------------|-------------------------|
| Donald L. Welsh | 16,665 |
| A. Sidney Katz | 24,003 |
| Richard L. Wood | 22,839 |
| Jerold B. Schnayer | 28,903 |
| Eric C. Cohen | 27,429 |
| Joseph R. Marcus | 25,060 |
| Gerald S. Schur | 22,053 |
| Gerald T. Shekleton | 27,466 |
| James A. Scheer | 29,434 |
| Daniel R. Cherry | 29,054 |
| Edward P. Gamson | 29,381 |
| Kathleen A. Rheintgen | 34,044 |
| Thomas W. Tolpin | 27,600 |
| Eric D. Cohen | 38,110 |
| Jon P. Christensen | 34,137 |
| Walter J. Kawula, Jr. | 39,724 |
| Leonard Friedman | 37,135 |
| Ik Hyun Seo | 40,165 |
| Philip D. Segrest | 39,021 |
| Jeffrey W. Salmon | 37,435 |
| Mitchell J. Weinstein | 37,963 |
| William C. Cray | 27,627 |
| John J. Deinken | 28,406 |
| Kyle Eppele | 34,155 |
| John J. Horn | 28,803 |
| John M. Miller | 38,560 |
| Susie H. Oh | 36,391 |
| James P. O'Shaughnessy | 27,667 |
| Keith L. Stephens | 32,632 |
| Philip K. Yu | 35,742 |

Full name of sole or one joint inventor:


Inventor's signature

Anthony J. Dezonno


Date

Residence and Post Office Address:

233 Pinewood Lane
Bloomingdale, Illinois 60108

Citizenship:

United States

Address for Correspondence:

WELSH & KATZ, LTD.
120 South Riverside Plaza
22nd Floor
Chicago, Illinois 60606